AWARD NUMBER: W81XWH-16-1-0746

TITLE: Effects of Alzheimer's Disease in the Prediagnosis Period on Financial Outcomes

PRINCIPAL INVESTIGATOR: Carole Roan Gresenz

CONTRACTING ORGANIZATION: RAND Corporation Santa Monica, CA 90401

REPORT DATE: October 2017

TYPE OF REPORT: Annual

PREPARED FOR: U.S. Army Medical Research and Materiel Command

Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release;
Distribution Unlimited

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

### REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
October 2017	Annual	30 Sep 2016 - 29 Sep 2017
4. TITLE AND SUBTITLE		5a. CONTRACT NUMBER
		5b. GRANT NUMBER
ECC ( CALL: LD: : 4 I	) 1' ' D ' 1 E' ' 10 (	W81XWH-16-1-0746
Effects of Alzheimer's Disease in the I	Prediagnosis Period on Financial Outcomes	5c. PROGRAM ELEMENT NUMBER
<b>6. AUTHOR(S)</b> Carole Roan Gresenz		5d. PROJECT NUMBER
		5e. TASK NUMBER
E-Mail: gresenz@rand.org		5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S	S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	NUMBER
RAND Corporation, The		
1776 Main St		
Santa Monica, CA 90401-3297		
9. SPONSORING / MONITORING AGENCY	NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
U.S. Army Medical Research and Mate	riel Command	
Fort Detrick, Maryland 21702-5012		11. SPONSOR/MONITOR'S REPORT NUMBER(S)
46 DIGEDIDIJE ON / AVAIL ADUJEV OF AT		

### 12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for Public Release; Distribution Unlimited

### 13. SUPPLEMENTARY NOTES

### 14. ABSTRACT

The goal of this research is to understand how Alzheimer's Disease (AD)—before it is diagnosable using currently availability tools—affects the financial well-being of the individuals and families of those it afflicts. We are conducting analyses of the Health and Retirement Study (HRS) data linked to Medicare claims data. The HRS includes longitudinal information on financial outcomes for a large panel of U.S. adults over age 50. Linking the HRS to Medicare claims data enables us to identify individuals who were diagnosed with AD by a physician and their date of diagnosis, so that we can look backward over time at the vulnerable period prior to diagnosis. In Year 1 of our project, we constructed the merged data; derived key dependent and independent variables and calculated descriptive statistics; and performed initial analyses of the effect of AD on financial outcomes. In the next phase of the project, we will refine and finalize our analyses and disseminate our results.

### 15. SUBJECT TERMS

Alzheimer's Disease, dementia, assets, savings, wealth, debt, financial outcomes

16. SECURITY CLAS	SIFICATION OF:		17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON USAMRMC
a. REPORT	b. ABSTRACT	c. THIS PAGE	UU	15	19b. TELEPHONE NUMBER (include area code)

### **Table of Contents**

	Page
1. Introduction	4
2. Keywords	4
3. Accomplishments	4
4. Impact	7
5. Changes/Problems	8
6. Products	9
7. Participants & Other Collaborating Organizations	9
8. Special Reporting Requirements	13
9. Appendices	13

### 1. INTRODUCTION

Alzheimer's Disease (AD) affects an estimated 5.3 million people in the U.S. and tens of millions of people worldwide, exacting substantial human and monetary costs. Existing tools for diagnosing AD lead to diagnoses that typically occur after the onset of severe symptoms. However, significant limitations and rapid declines in financial capacity occur among patients with mild and early stage AD, years before the disease is diagnosable. Some argue that financial decision-making deficits are among the first functional changes in people with AD. But, burgeoning limitations in financial capacity are unlikely to be fully appreciated or recognized by individuals and their families prior to diagnosis, and may therefore result in consequential effects on household financial outcomes such as spending, debt, and susceptibility to financial exploitation. Thus, the time period before AD is diagnosable represents a uniquely vulnerable period for individuals and households. The extent to which AD in its early stages contributes to adverse financial outcomes among those afflicted is unknown. We hypothesize that AD, during the period before it is diagnosable, negatively affects a wide range of household financial outcomes. We further hypothesize that the effects of AD during the period before it is diagnosable on household financial outcomes are more consequential when the financial head of household is afflicted as opposed to a spouse or partner of the financial household head. The goal of this research is to understand how AD—before it is diagnosable using currently availability tools—affects the financial well-being of the individuals and families of those it afflicts. We are conducting analyses of the Health and Retirement Study (HRS) data linked to Medicare claims data. The HRS includes rich, longitudinal information on financial outcomes for a large panel of U.S. adults over age 50. Linking the HRS to Medicare claims data enables us to identify individuals who were diagnosed with AD by a physician and their date of diagnosis, so that we can look backward over time at the vulnerable period prior to diagnosis.

### 2. KEYWORDS

Alzheimer's Disease, dementia, assets, savings, wealth, debt, financial outcomes

### 3. ACCOMPLISHMENTS

### Major Goals

Our specific aims are to (1) estimate the effects of AD during the period before it is diagnosable on household financial outcomes and (2) determine how the effects of AD during the period before it is diagnosable on financial outcomes differ depending on whether the financial head of household is afflicted or the spouse or partner of the financial head of household is afflicted.

**Major Task 1:** Submit data applications, including IRB application as well as application to HRS/CMS for restricted use data. *Anticipated Timeframe: Month 1. Completion: 100 percent* 

Major Task 2: Identify individuals with relevant conditions from linked HRS/Medicare claims data and construct observation periods. *Anticipated Timeframe: Months 1-5. Completion: 100 percent.* 

- **Milestone 1**: Apply algorithms to identify individuals with specific health conditions from the Medicare claims data. Identify date of diagnosis for individuals with AD and dementia. (*Completed*)
- **Milestone 2:** Construct the asymptomatic pre-diagnosis period (T1) and the symptomatic pre-diagnosis period (T2) for individuals diagnosed with AD. *(Completed)*

**Major Task 3: Construct variables and perform analyses.** Anticipated Timeline: Months 5-16 Completion: 60 percent.

- **Milestone 3:** Construct variables for the empirical models, including indicator for financial head of household. *(Completed)*
- Milestone 4: Conduct descriptive analyses. (Completed)
- **Milestone 5:** Estimate difference-in-differences models; conduct sensitivity analyses. (*In progress*)

Major Task 4: Assess potential selection bias using treatment effects model. Anticipated timeline: Months 15-20. Completion: 0 percent

- **Milestone 6:** Apply algorithm to identify individuals with probable dementia. (Not completed yet)
- **Milestone 7:** Estimate treatment effects model to ascertain if there is any bias associated with using a sample of persons with diagnosed AD in our main analyses; conduct sensitivity analyses. (*Not completed yet*)

Major Task 5: Manuscript preparation and dissemination. Anticipated timeline: Months 12-24. Completion: 5 percent

- Milestone 8: Prepare manuscripts based on the findings. (In progress)
- **Milestone 9:** Disseminate our findings including presentation at the DoD PRARP in-Progress Review Meeting.

### • Accomplishments by Goal

As indicated above, we completed Major Tasks 1 and 2 and completed more than half of Major Task 3. We indicated 5 percent completion on Task 5 because we have begun outlining our synthesis of findings and developed tables for descriptive statistics to be included in our report of findings. (Major Tasks 4 and 5 were scheduled to occur in Year 2 of the project). Major Task 1 included activities designed to provide us with the data we need for our analyses. We completed and submitted the application to the Health and Retirement Study (HRS) for permission to receive the restricted use HRS files that have geocodes and that can be merged with Medicare claims data. Our request was approved by HRS. We also submitted an application to ResDAC—the third-party vendor that the Center for Medicaid and Medicare Services (CMS) uses for data requests for research—to obtain the Medicare claims data for individuals in the HRS. We also submitted our application to RAND's IRB.

While awaiting access to the merged HRS-Medicare claims data, we took care of important logistical tasks: We hired a research programmer, identified a RAND staff member with expertise in the HRS to advise us, set up a dedicated office with a tailored computer system to house the merged data (as required by the HRS/ResDAC data use agreements). We also worked

extensively with the with the public use HRS data. We compiled the longitudinal waves of the public use data sets; identified relevant variables; began the process of variable derivation; and produced initial descriptive statistics. We identified contextual variables (variables at various geographic levels like county, state) that we would like to merge onto the HRS, and compiled them from various sources. When we received access to the geocoded HRS, but before we had access to the Medicare claims data, we merged the contextual variables to the public use data.

Despite our timeliness in submission of the various applications for data, approval for the data merge took several months, and we only received our HRS and Medicare claims data in mid-May. Since receiving the data, we have worked in earnest on our analyses. We identified the subset of HRS respondents who have linked Medicare claims data and used established diagnostic algorithms to identify respondents with diagnosed AD or dementia. (We can think of these as our "treatment" group.) Although there is a flag indicating date of initial diagnosis on the CMS files, we developed our own coding of initial date of diagnosis to double check the accuracy of the CMS flag. The analytic variable we use for date of diagnosis is the earlier of either the CMS-derived date or the date we derived.

We also identified our "control" group. We identified individuals who had no indication of cognitive impairment in the claims data or in the HRS survey questions designed to assess cognitive status (TICS—Telephone Interview of Cognitive Status—measures as well as self-reported memory problem). To maximize our sample size, we included all individuals with no cognitive issues. We originally anticipated that we would limit our control group to those with arthritis (RA/OA) to reduce concern about the endogeneity of diagnosis, but determined that the larger sample size for the control group outweighed the advantage of having a control group with a diagnosed condition, especially because of the universal access to health care for individuals over 65 through Medicare.

We calculated descriptive statistics for our analytic sample, for both our financial outcomes measures and our independent variables. We created derived outcome variables from our continuous measures, including dichotomous indicators of a large change between waves (e.g. a large decrease in liquid assets, a large increase in total debt) and indicators of any decrease/increase in outcomes. We conducted preliminary regression analyses of the continuous and dichotomous outcomes. We decided on a specification that maximizes the value of our panel data. Specifically, each observation is a household-wave and we are running fixed effects models that use within-household variation over time to identify the effect of being in the vulnerable time period associated with being symptomatic but undiagnosed. The control observations add to our identification of the effects of place, year and contextual variables.

### • Training and professional development opportunities

Nothing to report

### Dissemination of Results to Communities of Interest

Nothing to report. Work still in progress.

### • Plans for Next Reporting Period

o In the next reporting period (year 2 of our project), our focus will be on refining our analyses and completing Tasks 4 and 5. We will continue to work with our analytic sample and analytic variables. We plan to present our work in progress informally to

colleagues at RAND and Georgetown to gather feedback to help improve our work. We will finalize our analyses and write up our results for publication and will work to further disseminate them through other means.

### 4. IMPACT

### • Impact on the Development of the Principal Discipline

This work will have impact in several important ways. First, this work makes an important contribution to cost-of-illness studies. In the context of dementia, cost-ofillness studies have focused on economic costs associated with health care for the condition or home care/caregiving required for individuals afflicted by dementia. This work provides a broader lens through which to think about cost-of-illness, and will contribute to a more comprehensive understanding of the true costs of dementia. Second, this work will make an important contribution to how we think about valuing screening tools for conditions, especially those for which treatment options are either non-existent or limited. Sources of value are less obvious compared to conditions for which early treatment improves health outcomes; but, in the case of dementia, the signaling value of diagnosis may be very important for avoiding adverse financial outcomes. This work advances the field by quantifying the potential value of that signal. In addition, this work has led us to think more about the relationship between health and wealth more generally—a long-standing issue of concern for health and labor economists—and what other novel data might be combined to address key questions such as the one this research addresses. This work has also helped catalyze ideas around the potential of new data sources—such as Medicare claims data combined with a longitudinal consumer credit data—to further examine the nexus between health and wealth, generally, as well as between Alzheimer's disease and financial outcomes specifically.

### • Impact on Other Disciplines

Nothing to Report

### Impact on Technology Transfer

Nothing to report

### Impact on Society beyond Science and Technology

As described above, the research will be important at a societal level for providing increased visibility regarding the true costs of dementia and, at the household-level, for helping families recognize the potential vulnerability of their spouses and parents even when cognitive symptoms may be limited. Furthermore, the research will provide information about the types of vulnerabilities that are most likely to affect individuals with dementia before it can be diagnosed with currently available tools. Knowing the adverse outcomes to which individuals with AD are most susceptible is crucial for designing and targeting interventions to help prevent them. This is another dimension of the long-term value of the research—the possibility of developing indicators based on financial data for identifying people who should receive additional screening for AD.

### • Changes in Approach and Reasons for Change

o Some minor analytic decisions varied slightly from the approach we described in the proposal: We expanded our control group to include individuals that were cognitively healthy, regardless of whether they had another (non-cognitive) chronic condition, in order to increase our sample size. We also had planned to study foreclosure as an outcome, but the prevalence of foreclosures in the data is very limited and the variation is insufficient for studying foreclosures as a separate outcome. As we indicated in the proposal, we will create a summary variable that combines foreclosure with other infrequent but significant outcomes and examine whether the variation in that summary variable is sufficient for analysis. Additionally, in looking at the diagnosis codes in the claims data, we had large number of claims coded as dementia, not otherwise specified (NOS)/classified. To ameliorate concern that many of these NOS dementia cases may in fact be AD and in consultation with our collaborator, Dr. Federoff, our main analyses to date have included all dementias. In other analyses, we will look only at those individuals with claims indicating a definitive diagnosis of AD (vs other dementias) and at individuals with either AD or dementia, NOS.

### • Actual or Anticipated Problems or Delays and Actions or Plans to Resolve Them

• The approval/arrival of our data took longer than we anticipated. While we waited for the data, we made significant progress using the public use HRS data.

### • Changes That Had a Significant Impact on Expenditures

o The delay in data slowed down our spending in the early part of the first year, although we did move forward with analyses of available public use data to ameliorate the effects of the delay. With the data now in hand, our analytic efforts will accelerate in year 2 to ensure timely completion of the project.

### Significant Changes in Use or Care of Human Subjects, Vertebrate Animals, Biohazards, and/or Select Agents

- No significant deviations, unexpected outcomes, or changes in approved protocols for the use or care of human subjects, vertebrate animals, biohazards, and/or select agents during the reporting period.
- o Institutional Review Board approval dates:
  - Human Resources Protection Office (HRPO) Protocol [HRPO Assigned Number]: A-19817; Title: Effects of Alzheimer's Disease in the Pre-diagnosis Period on Financial Outcomes; HRPO contact: Karen Eaton, Human Subjects Protection Scientist
  - Initial IRB review approved by RAND IRB (Human Subjects Protection Committee) for period from 5/31/16-5/30/2017 (HSPC ID 2016-0395). IRB memorandum received June 2, 2016.

 Continuing review approved by RAND IRB (HSPC) on May 1, 2017, expires 30 May 2018. HRPO continuing review acknowledgement memorandum, received May 31 2017.

### 6. PRODUCTS

- Publications, conference papers, and presentations
  - Journal publications. Nothing to report
  - Books or other non-periodical, one-time publications: Nothing to report
  - Other publications, conference papers, and presentations: Nothing to report
- Website(s) or other Internet site(s): Nothing to report
- Technologies or techniques: Nothing to report
- Inventions, patent applications, and/or licenses: Nothing to report
- Other Products: Nothing to report

### 7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

### • What individuals have worked on the project?

Name:	Carole Roan Gresenz
Project Role:	PI
Researcher Identifier (e.g. ORCID ID):	0000-0002-7381-7914
Nearest person month worked:	1
Contribution to Project:	Dr. Gresenz had primary responsibility for preparing the data use and IRB applications. Dr. Gresenz, together with Dr. Mitchell, directed the work of Mr. Kofner, the programmer, on the public use HRS files and the merged HRS/claims data. She has led weekly team meetings.
Funding Support:	In addition to this award, Dr. Gresenz receives support from AHRQ for a study of how physician practice structure and compensation characteristics affect prostate cancer treatment outcomes. Dr. Gresenz also received internal funding (from RAND) for a study of gun policy in America. In addition to her research responsibilities, Dr. Gresenz' other responsibilities include directing the Economics, Sociology and Statistics Department at RAND, which accounts for the remainder of her time.

Name:	Jean Mitchell
Project Role:	Co-investigator
Researcher Identifier (e.g. ORCID ID):	0000-0002-2765-4624

Nearest person month worked:	2
Contribution to Project:	Dr. Mitchell, together with Dr. Gresenz, directs the work of Mr. Kofner, the programmer, on the public use HRS files and the merged HRS/claims data. She participates in regular team meetings. She had primary responsibility for overseeing the RA's work identifying recent literature related to dementia and financial outcomes and for synthesizing the results of the literature review. She had primary responsibility for directing Mr. Kofner in the creation of variables from the Medicare claims data.
	In addition to this award, Dr. Mitchell serves as principal investigator for a grant funded by AHRQ to examine the influence of physician practice structure and compensation characteristics affect prostate cancer treatment outcomes among men with low-risk prostate cancer. Dr. Mitchell also serves a principal investigator for a grant funded by the National Cancer Institute to evaluate treatment patterns and health outcomes among women with newly diagnosed ductal carcinoma. Dr. Mitchell has institutional support from Georgetown University to identify factors associated with the increased use of contralateral prophylactic mastectomy among women diagnosed with non-metastatic unilateral
Funding Support:	breast cancer.

Name:	Aaron Kofner
Project Role:	Research programmer
Researcher Identifier (e.g. ORCID ID):	0000-0001-6980-1218
Nearest person month worked:	3
Contribution to Project:	Mr. Kofner analyzed public use data files under the direction of Drs. Gresenz and Mitchell. He derived analytic variables, conducted descriptive analyses, and merged contextual data to the HRS. He also has worked with the merged HRS/Medicare data. He conducted all of the data cleaning, variable creation, and data analysis implementation for the restricted use, merged HRS/Medicare claims data.
Funding Support:	Mr. Kofner receives funding from the United States Air Force to conduct a needs assessment of active, guard and reserve Airmen, their spouses, and Air Force civilian employees and from the Centers for Medicare and Medicaid Services to support state Medicaid agencies in designing and implementing alternative payment models. Mr. Kofner also receives internal funding from RAND for maintain and supporting various internal GIS, computing, and data protection needs.

Name:	Caitlin Chamberlain
Project Role:	Research Assistant

Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	1
Contribution to Project:	Ms. Chamberlain conducted a literature review under Dr. Mitchell's direction to find updated estimates of the prevalence of AD and dementia; new literature on dementia/AD and mortality; new studies that look at the timeline of progression from first cognitive symptoms to diagnosis; new literature on AD/dementia and financial decision-making; literature on cognitive status more generally and financial decision-making and financial outcomes such as wealth/savings/debt; and additional studies that examine the accuracy of claims data to identify date of diagnosis and dementia/AD.
Funding Support:	N/A

### • Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

### o Dr. Gresenz

- Since this is our first annual reporting period, we are providing changes between the most recent other support information provided (May 2016) and now.
- Previously active projects now completed
  - Dr. Gresenz' role on the RAND Initiated Research Project on Gun Violence has concluded. The project itself is nearly but not totally completed.
  - Dr. Gresenz' role on the Virginia Department of Medical Assistance Services (DMAS) project has concluded.
  - Georgetown University Massive Data Institute Seed Grant: This project ended in June 2016.
- Pending support now active
  - AHRQ funded the project "Assessing the Value of Aggressive Treatment of Low-Risk Prostate Cancer." Dr. Gresenz is a coinvestigator with an anticipated commitment of 20 percent time. The project started 9/30/16.

### o Dr. Mitchell

- Since this is our first annual reporting period, we are providing changes between the most recent other support information provided (May 2016) and now.
- Previously active projects now completed
  - Georgetown University Massive Data Institute Seed Grant: This project ended in June 2016.
  - AHRQ funded grant "Evaluation of ASC Specialization, Costs and Payment Rates." This grant ended April 30 2017.
- Pending support now active

- AHRQ funded the project "Assessing the Value of Aggressive Treatment of Low-Risk Prostate Cancer." The project started 9/30/16. Dr. Mitchell's slated effort is 25 percent.
- NCI funded the study "Population-based Assessment of Treatment Patterns and Outcomes for Women with Newly Diagnosed Ductal Carcinoma in Situ." This grant began February 1, 2017. Dr. Mitchell devotes 27 percent time.
- New active support
  - Dr. Mitchell has institutional support from Georgetown University to identify factors associated with the increased use of contralateral prophylactic mastectomy among women diagnosed with nonmetastatic unilateral breast cancer. This support started August 31, 2016 and the level of effort is 2 percent.

### • What other organizations were involved as partners?

During the first project year, we partnered with Georgetown University and the University of California-Irvine (UCI). One of the project's co-investigators (Dr. Mitchell) is affiliated with GU and our research assistant is also at GU. We also have collaborated with Dr. Howard Federoff of UC Irvine.

- o <u>Organization Name</u>: Georgetown University (academic institution)
- o Location of Organization: Washington, DC
- o Partner's contribution to the project
  - Facilities
    - Dr. Mitchell's affiliation is with Georgetown University. She uses GU facilities to conduct her work, including her office and computing equipment. The research assistant, Caitlin Chamberlain, also is associated with GU and conducts her work using computing technology from the University.
  - Collaboration
    - Dr. Mitchell is a co-investigator on the award. She collaborates with Dr. Gresenz on all aspects of the project and additionally oversees a research assistant, also from GU, who also contributes to the project.
- o Organization Name: University of California-Irvine (academic institution)
- o <u>Location of Organization</u>: Irvine, CA
- o Partner's contribution to the project
  - Facilities
    - Dr. Federoff's affiliation is UCI. He uses GU facilities to conduct his work, including her office and computing equipment.
  - Collaboration
    - Dr. Federoff has provided expert consultation on clinical aspects of dementia and AD that affect our work. He provided us with information about appropriate use of diagnostic codes related to

AD/dementia and helped us with clinical knowledge related to the timing of the typical progression of disease from cognitive normalcy through MCI to severe dementia.

### 8. SPECIAL REPORTING REQUIREMENTS

• Quad Chart

o Attached: see page 14

### 9. APPENDICES

- Table of descriptive statistics for our analytic sample
  - o Attached: see page 15

# Effects of Alzheimer's Disease in the Prediagnosis Period on Financial Outcomes AZ150099

W81XWH-16-1-0746

PI: Carole Roan Gresenz

Org: RAND Corporation Award Amount: \$757,578

### (0)

### Study/Product Aims

- Estimate the effects of AD during the period before it is diagnosable on household financial outcomes.
- Determine how the effects of AD during the period before it is diagnosable on financial outcomes differ depending on whether the financial head of household is afflicted or the spouse or partner of the financial head of household is afflicted.

### Approach

We analyze Health and Retirement Study (HRS) data linked to Medicare claims data. The HRS includes rich, longitudinal information on financial outcomes for a large panel of U.S. adults over age 50. Linking the HRS to Medicare claims data enables us to identify individuals who were diagnosed with AD by a physician and their date of diagnosis, so that we can look backward over time at the vulnerable period *prior* to diagnosis. We use a difference-indifferences approach to evaluate the effect of AD during the period before the disease is diagnosable on financial outcomes.



Accomplishments: Created merged HRS/claims data set for analysis, identified individuals with AD, dementia and coded date of initial diagnosis, created observation window; constructed descriptive statistics; ran initial regression analyses.

Goals/Milestones Not begun Begun, not complete Complete

Milestone 1/2: Identify treatment and controls from merged data and construct observation periods

Milestone 3/4: Construct variables and conduct descriptive analyses.

Goals/Milestones Spanning Years 1-2

Milestone 5: Estimate difference-in-differences models; conduct sensitivity analyses.

Year 2 Goals/Milestones

Milestone 6/7: Apply algorithm to identify individuals with probable dementia and estimate treatment effects model

Milestone 8/9: Prepare manuscripts and disseminate results

Comments/Challenges/Issues/Concerns

Received merged data in mid May. Behind original timeline in terms of

analysis of merged data but ameliorated delay by extensively working

## Budget Expenditure to Date

with public use files.

Projected Expenditure: Originally projected ~half of award total (382k) Actual Expenditure: \$262,955 (lower than projected due to data delay)

## Timeline and Cost

Activities	Q1-Q2	Q1-Q2 Q3-Q4 Q5-Q6 Q7-Q8	Q5-Q6	97-08
Apply for and obtain restricted use data (IRB, HRS, CMS applications)				
Identify analytic sample using merged data; construct observation periods				
Construct variables and perform analyses				
Manuscript prep and dissemination				
Estimated Budget (\$K)	\$38.	\$381,662	\$375,916	916

Updated: 30 Sep 2017

Appendix Table 1: Descriptive Statistics for Analytic Sample

	Full Analytic Sample	Cognitively Healthy	Dementia
	(n=5,490)	(n=3,261)	(n=2,229)
Household Characteristicis	Mean (Std Err)	Mean (Std Err)	Mean (Std Err)
Demographic Characteristics			
Highest education is less than HS*	0.23 (0.006)	0.16 (0.006)	0.33 (0.01)
Highest education is HS or GED*	0.33 (0.006)	0.33 (0.008)	0.33 (0.01)
Highest education is college or more*	0.44 (0.007)	0.51 (0.009)	0.34 (0.01)
Non-White or Hispanic *	0.21 (0.006)	0.19 (0.007)	0.23 (0.009)
Foreign born *	0.1 (0.004)	0.09 (0.005)	0.11 (0.007)
Age*	67.45 (0.148)	63.44 (0.181)	73.32 (0.194)
Family/Household Structure			
Married/Partnered	0.48 (0.007)	0.46 (0.009)	0.51 (0.011)
Separated/Divorced	0.13 (0.005)	0.21 (0.007)	0.02 (0.003)
Widowed	0.33 (0.006)	0.26 (0.008)	0.42 (0.011)
Never married	0.06 (0.003)	0.07 (0.005)	0.04 (0.004)
1 person in household	0.35 (0.006)	0.34 (0.008)	0.36 (0.01)
2 people in household	0.42 (0.007)	0.39 (0.009)	0.46 (0.011)
3+ people in household	0.23 (0.006)	0.27 (0.008)	0.17 (0.008)
Fair/poor self-reported health * Chronic conditions (average)	0.32 (0.006) 1.28 (0.015)	0.28 (0.008) 1.24 (0.019)	0.39 (0.01) 1.35 (0.023)
Dementia in both respondent and spouse/partner	0.05 (0.003)	0 (0)	0.13 (0.007)
Financial Outcomes			
Any savings	0.28 (0.003)	0.28 (0.003)	0.28 (0.004)
Mean conditional savings (savings if >0)	44582 (628.1)	43390 (787.6)	46705 (1040.1
Mean savings (unconditional)	12422 (209.4)	12166 (261.8)	12871 (349)
Any debt	0.26 (0.003)	0.29 (0.003)	0.19 (0.004)
Mean conditional debt (debt if >0)	7548 (125.6)	7832 (148.6)	6788 (233.9)
Mean debt (unconditional)	1926 (37.2)	2286 (50.4)	1296 (51.4)
Any wealth	0.8 (0.002)	0.82 (0.003)	0.78 (0.004)
Any negative wealth	0.11 (0.002)	0.11 (0.002)	0.09 (0.003)
Mean conditional wealth (wealth if >0)	141749 (1644.8)	152987 (2117.2)	120897 (2559)
Mean conditional negative wealth (wealth if <0)	-4549 (115.6)	-5805 (165.7)	-2800 (145.2)
Mean wealth (unconditional)	113145 (1364.8)	124605 (1793.5)	93074 (2044)
Any assets	0.9 (0.002)	0.92 (0.002)	0.87 (0.003)
Any negative assets	0.05 (0.001)	0.05 (0.002)	0.05 (0.002)
Mean conditional assets (assets if >0)	271100 (2837.7)	303687 (3688.9)	210987 (4275.2
Mean conditional negative assets (assets if <0)	-3677 (125.8)	-5064 (193.5)	-2112 (144.5)
Mean assets (unconditional)	243386 (2595.6)	277749 (3435)	183207 (3780.5

\*Note: Pertains to respondent or spouse/partner